Statement of Mark Rey
Undersecretary for Natural Resources and Environment
United States Department of Agriculture

Before the Committee on Resources
United States House of Representatives

Concerning the Natural Lynx Survey
March 6, 2002

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to appear before you today along with Mr. Tom Thompson, Deputy Chief for National Forest Systems of the Forest Service and Dr. Kevin McKelvey, Research Scientist at the Forest Service's, Rocky Mountain Research Station. Dr. McKelvey will also offer testimony on a later panel.

I would like to defer to Mr. Thompson to review the circumstances that bring us here today. Then I will offer a few brief, concluding remarks so as to not unnecessarily delay the expected horsewhipping. Mr. Thompson, Dr. McKelvey, and I will be available to respond to questions.

- - - - - -

The events described by Mr. Thompson have engendered considerable consternation. They present us with specific management challenges that we will meet. More broadly, however, they raise two serious questions which go beyond the facts of this particular event.

First, the events described by Mr. Thompson achieved such resonance because they apparently ratify a suspicion held by some about the use of scientific information in resources decision-making -- that is, information is manipulated under the guise of dispassionate expertise to achieve desired, or even predetermined, outcomes. This did <u>not</u> occur in this instance, but the rush to judgment that it <u>did</u> should serve as a warning signal to us.

Second, these events highlight a myth that has grown up in the midst of natural resources decision-making. The myth is that "good science" can, <u>by itself</u>, somehow make difficult natural resource decisions for us, and relieve us of the necessity to engage in the hard work of democratic deliberations that must finally shoulder the weight of those decisions.

In the case of endangered species issues, this myth has been, in my opinion, carried to an extreme. There is a perception that a limited number of people, with similar or identical expertise, and without much outside scrutiny, use sometimes extremely limited scientific data -- even though they may be the best data available -- to render decisions. These decisions trigger legally automatic results that, increasingly, have sweeping social and economic impacts.

It would be counterproductive to dwell on the facts of this specific case without trying to learn how to use science more wisely in the complex political milieu that surrounds issues like endangered species recovery. Rather than meeting out punishment, the broader management challenge is to enlist biologists as partners in developing policy and gaining congressional and public support for federal land management decisions.

A second challenge is one that we must share -- that is, to review and streamline the entire natural resources decision-making process, with scientific accuracy, accountability, accessibility, trust-building, and efficiency as our goals. This will also give higher value to the knowledge of scientists as we apply their expertise in real-time decisions.

These are problems that the Chief of the Forest Service and I have acknowledged before this committee, and are committed to working with the committee to resolve.

Thank you.

Statement of
Tom L.Thompson
Deputy Chief, National Forest System
United States Department of Agriculture

Before the Committee on Resources
United States House of Representatives

Concerning

The National Lynx Survey

March 6, 2002

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to appear before you today to talk about the National Canada Lynx Survey. My name is Tom Thompson, Deputy Chief National Forest System, Forest Service. Today, I am accompanied by Kevin McKelvey, Research Scientist at the Forest Service's Rocky Mountain Research Station, who developed protocols for the National Lynx Survey and who will testify on a later panel.

In late September, 2000, a Forest Service employee called the lynx survey coordinator to report that he and some co-workers from the Gifford Pinchot National Forest sent an unauthorized lynx hair sample to the survey coordinator. The stated purpose was to test the DNA process for detecting lynx. A subsequent investigation by the Forest Service revealed that three of the agency's employees were involved. The investigation also determined that two additional unauthorized samples of lynx hair were submitted by two U.S. Fish and Wildlife Service and two Washington State Department of Fish and Wildlife employees, and labeled as having come from the Wenatchee National Forest. A number of other employees of the three agencies knew about the activities but did not report them.

These actions have threatened the credibility of the Forest Service and of other science based agencies. Under the leadership of Chief Dale Bosworth, the Forest Service has acted aggressively to sort out what happened and identify problems, to restore its integrity, and to assure that information associated with the National Lynx Survey is sound. Today, I would like to give you background about the lynx, describe the lynx conservation efforts underway, and describe the design of the National Lynx Survey. Lastly, I will touch on the ongoing investigations and actions that have been taken to date.

Background

The Canada lynx is a medium sized member of the cat family, noted for having long ear tufts and large feet that are highly adapted for hunting in deep snow. Lynx feed primarily on snowshoe hares, a type of rabbit.

The historical range extends from Alaska across much of Canada, with the southern extensions into parts of the northwestern United States, the Great Lake states, and New England. Within the contiguous United States, the distribution of lynx is associated with subalpine coniferous forests in the West and primarily mixed coniferous/deciduous forests in the Great Lakes and East. Lynx habitat occurs primarily on National Forest System and Bureau of Land Management lands in the West, and lynx has been a rare species for several decades.

Lynx Conservation

Because of its conservation status, and a proposal to list lynx as a threatened species in 1998, land managers and scientists realized that there was a pressing need to know more about the ecology of the lynx. A group of internationally recognized scientists specializing in lynx biology and ecology did an analysis and summarized the best scientific information about the lynx. A team of Forest Service, Bureau of Land Management, Fish and Wildlife Service and National Park Service managers and researchers convened to identify how to better manage for the conservation of lynx on federal lands. The effort also included representatives of state fish and wildlife agencies. They reviewed the state of knowledge on lynx and developed a management strategy for federal lands based on the best available science. This effort has produced several important documents: the Lynx Science Report, Lynx Conservation Assessment and Strategy, Lynx Conservation Agreement, and Lynx Biological Assessment.

The Fish and Wildlife Service issued the final rule to list the lynx as threatened under the Endangered Species Act on March 24, 2000, primarily because of the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for lynx conservation in federal land management plans. On February 7, 2000, and August 22, 2000, respectively, the Forest Service and the Bureau of Land Management signed conservation agreements with the Fish and Wildlife Service to guide interagency lynx conservation efforts through 2004. Among other actions, under the Forest Service-Fish and Wildlife Service Lynx Conservation Agreement, the Forest Service agreed that Forest Plans should include measures necessary to conserve lynx for all forests that have lynx habitat. Development of such measures would include consideration of the Lynx Science Report, the Lynx Conservation Assessment and Strategy and the Fish and Wildlife Service's listing decision. Any necessary changes in these plans would be made through amendment or revision.

Land Management Plans

Planning efforts have begun to incorporate the lynx conservation measures into Forest Plans. Forest Plan amendments or revisions are scheduled for national forests in Washington, Oregon, Idaho, Montana, Wyoming, Utah, Colorado, Minnesota, Michigan, Wisconsin, New York, Vermont, and New Hampshire, and for BLM units in Idaho and Utah. All of the amendments and revisions propose management direction for lynx and are based on the conservation measures recommended in the Lynx Conservation Assessment and Strategy.

The on-going amendments and revisions are at different stages. Most units have completed the initial public scoping and are preparing environmental documents. Draft analysis documents are being prepared for public review and comment. Some decisions are expected this year. The remaining forests and BLM units will likely begin amendment or revision in the next couple of years.

The National Lynx Survey is being used to document current distributions of lynx and will be used to refine habitat mapping, because we recognize that all potential lynx habitat is not occupied. The results of the survey will increase our knowledge about the current distribution of lynx but will not directly affect the ongoing plan amendment or revision process.

1999-2002 National Canada Lynx Survey

In 1999, the Forest Service began a three-year nationwide survey of habitat to better identify presence and absence of lynx or lynx populations. Dr. McKelvey will describe this effort in more detail in the next panel. This survey is based on peer reviewed and published research. The protocols included standards for training in field methods, standards for field data collection, and standards for the DNA analysis of hair samples to determine the hair was from lynx or from another species. The Carnivore Conservation Genetics Laboratory on the University of

Montana campus in Missoula, Montana, developed the DNA protocols. Dr. L. Scott Mills, who will testify later today, heads the Missoula Lab.

The research scientists designed the survey protocols using a systematic approach described in the Lynx Science Report and in other peer reviewed journals. The first step is to ascertain current distribution by means of presence/absence surveys. If lynx presence is detected in an area, the next step is to find out what the presence means: it could be a pet, a fur-farm escapee, or a lone wild lynx passing through the area. To separate out these situations from those of a resident lynx population, research scientists follow-up by conducting intensive snow track surveys, designed and run by Dr. John Squires who is currently conducting a large radio telemetry study of lynx in Montana. If the unauthorized samples had not been identified, the follow-up protocols would have been used to find out if lynx were present.

Lynx hairs have been found in only two areas where we did not know lynx occurred. These two areas were in the Boise and the Shoshone National Forests. As the survey protocols require, research scientists are doing follow-up intensive snow tracking in these areas to help determine the extent and significance of the lynx occurrences.

Forest Service Investigation of the National Lynx Survey and Follow-up Actions

Following the Forest Service investigation, a number of actions have taken place. Forest Service employees responsible for submitting unauthorized samples (except the now retired employee) have been made aware of the seriousness of their actions by their Forest Service supervisors. None of the individuals involved in submitting unauthorized samples from the three agencies has been allowed to participate in the 2001 and future portions of the 1999-2002 lynx survey effort.

When Chief Bosworth became aware of the unauthorized samples, and in light of continuing questions about the survey, he asked the USDA Inspector General to look more fully into the allegations of unauthorized samples. The Department of the Interior's Inspector General and the General Accounting Office (GAO) also are looking into this issue. The ongoing investigations may ultimately indicate that further action is warranted by agency managers.

The Chief recently directed that the already existing Forest Service Code of Scientific Ethics be applied to all Forest Service employees, agency partners, and cooperators who participate in research funded with Federal research appropriations. The Administration and Congress have been adamant that the information collected and used by the Federal Government be top-quality. The importance of professional conduct and ethical behavior is being emphasized with employees at meetings and as part of training modules.

The research scientists did not include the unauthorized hair samples in the survey data. They also reviewed the field notes for anomalies. Other than the Boise and Shoshone samples, no other lynx were identified outside known areas and, as mentioned earlier, follow-up survey protocols are being used. Based on these factors, the research scientists believe they can verify the scientific authenticity of the National Lynx Survey. Let me be very clear: the unauthorized samples have been excluded from this survey.

Summary

In summary, Mr. Chairman, we know unauthorized samples were inappropriately submitted by employees. The integrity of the National Lynx Survey has been questioned. However, the scientists believe the study remains valid. No land management plans have been changed because of the unauthorized lynx hair samples. Three investigations are underway. The Forest Service Code of Scientific Ethics now applies to all Forest Service employees, partners, and contractors that work on Forest Service research. I regret this incident and the actions of a few agency employees. Although the unauthorized samples were detected and did not compromise the validity of the lynx survey, such situations call into question the Forest Service's integrity. The Forest Service is a science-based organization, and ANY efforts to collect, analyze, display, communicate, and use species or other resource information must be conducted to professional and ethical standards and within established scientific protocols.

Mr. Chairman and members of the Committee, this concludes my statement.
We would be happy to answer any questions you might have.

Statement of
Kevin S. McKelvey
Research Scientist
Rocky Mountain Research Station
U.S.D.A. Forest Service

Before the Committee on Resources
U.S. House of Representatives

Concerning
National Canada Lynx Survey

March 6, 2002

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to appear before you today to talk about the National Canada Lynx Survey. I am Kevin McKelvey and I am a research scientist working for the Rocky Mountain Research Station of the USDA Forest Service. I am the scientist with the responsibility of overseeing the National Lynx Survey effort, including design, analysis, reporting and results publication. Today, I would like to describe the background and objectives, survey methods, DNA analyses, and measures used to ensure quality and reliability associated with the National Lynx Survey.

Background

In 1994, the Rocky Mountain Research Station was charged with evaluating the current state of knowledge concerning forest carnivores, including the Canada lynx. Their published findings (Ruggiero et al. 1994) indicated that knowledge gaps concerning forest carnivores, and lynx in particular were huge. In 1998, with the proposed listing of the lynx under the Endangered Species Act, the potential consequences of this lack of knowledge became critical. The Rocky Mountain Research Station was charged with collating and evaluating all of the knowledge concerning lynx, their prey, competitive interactions, and ecological context.

As a part of this effort, in 1999, Dr. Keith Aubry, Yvette Ortega, and I finished an analysis of the historical records for lynx in the contiguous United States. However, these data are ambiguous concerning the current range of the species. To build an effective conservation strategy, we need to determine where extant populations of lynx are and where they are not. The first step is to determine where there are lynx, secondly, to determine numbers and look for evidence of reproduction- that is, residency in an area - and finally, to determine patterns of habitat use and conservation needs (Figure 1). The National Lynx Survey was designed as the first step in this multi-stage process, with follow-up surveys in areas where lynx are detected serving as the beginning of the second step.

Dr. Leonard F. Ruggiero, Dr. John R. Squires, Gregory W. McDaniel and I at the Rocky Mountain Research Station developed and published the data collection methods used in the survey. Dr. L. Scott Mills, of the University of Montana, Kristine Pilgrim, Dr. Michael Schwartz, and I developed and published the DNA methods used to distinguish lynx from other species. The survey is based on peer reviewed and published research. The protocols included standards for training in field methods, standards for field data collection, and standards for the DNA analysis of hair samples to determine if the hair was from lynx or from another species. The National Lynx Survey is funded by and reports directly to the National Lynx Steering Team, an interagency oversight group headed by Kathy McAllister, Deputy Regional Forester for Region 1 of the USDA Forest Service. The National Lynx Survey has three primary leaders: James Claar, (Region 1, USDA Forest Service), Dr. L. Scott Mills, and me. I have general oversight and design of the entire survey effort. James Claar is responsible for coordinating with the field offices, distributing funds and materials, and training. Dr. Mills, Director of the Carnivore Conservation Genetics Laboratory, is responsible for the protocols associated with DNA analysis. This laboratory is jointly supported by the University of Montana, the Rocky Mountain Research Station, and Region 1 of the Forest Service. Because Dr. Mills is testifying at these hearings and will describe the DNA methods, I will limit my discussion of DNA protocols.

In order to be effective, we determined that the National Lynx Survey needed to have the following characteristics:

1) It had to produce unambiguous results. We didn’t want to spend a lot of time doing extensive follow-ups in areas that contained no lynx.

2) It needed to cover large areas of land, and therefore needed to be compact and inexpensive. It was critical that the method not be so cumbersome that surveys would be largely confined to roaded areas.

3) It needed to be a method that worked in the summer. Winter methods cannot be applied in avalanche-prone or extensive roadless areas.

4) It needed to be effective enough that lynx populations can be reliably found. It is just as important to specify where lynx likely do not exist as to determine where they exist. These two understandings are required to define current distribution.

5) Because the survey was to be applied by a large number of people with various backgrounds, it had to be simple and straightforward, and not demand special skills. Field work had to be limited to data collection only.

These considerations led us to discount most of the current survey methods. The hair snagging method, however, used scent stations to collect hair and DNA analysis to determine species. It satisfied all the requirements for the survey. After we detected lynx using hair snagging, we could then employ more intensive methods, such as snow tracking, to verify the detections and gain additional information regarding lynx populations.

Survey Design

The goal of the National Lynx Survey is to detect lynx and help to define current range. It is a presence/absence survey. Therefore, the study has to be designed to detect lynx, if present, with high likelihood. If this goal is achieved, failure to detect lynx indicates their absence or extreme scarcity, allowing possible range delineation. We tested the probability of detection directly by implementing the survey in as many areas as possible where lynx are known to be present.

Detection testing in the contiguous United States is limited because we know of so few locations where lynx occur. In Northwest Montana, we know of approximately 20 lynx in the Clearwater drainage around Seeley Lake, Montana because our research group is conducting a large radio-telemetry study in the area. We know that lynx occur in the Okanogan National Forest in northwest Washington State, based on ongoing camera surveys. We know of a tiny group in Wyoming, probably no more than 5 individuals that exist in the northern portion of the Wyoming range. Lastly, we know that lynx exist in northern Maine. Additionally, there was evidence of lynx occurrence in Glacier National Park and in the Pioneer Range in Southwest

Montana. We placed surveys in all these locations and have currently run them for at least one year.

While extensive, the surveys could not cover the entire historical range of the lynx. We therefore centered grids with transects on large contiguous areas of designated lynx habitat. Additionally, we specified that the survey be run in each location for 3 years. We took a number of measures to regularize methods and ensure consistency. We used common training with the same instructor across the survey, and we provided a “kit” for each survey. The kit contained everything necessary to conduct the survey. Important components (hair snares, visual attractants, desiccant filled vials, lure etc.) were all produced at a central facility to ensure consistency. An extremely detailed field manual was also included in each kit.

Additionally, the field protocol was simple: people had to bait the lures as specified (we provided the measurement spoons), place the transects on a grid, set up each station as specified, collect hair 2 weeks later, place hair in the provided vials and the associated carpet pads in plastic bags (also provided), label the vials and bags and mail all vials and the associated pads to us. As long as there was sufficient supervisory control to assure that these steps were done properly, there is no reason that crews of variable make-up and skills could not successfully carry out the protocol.

DNA Analysis of Hair

Hair vials were shipped to the Missoula Lab in boxes or envelopes and were transferred unopened to our “hair lab,” a facility on the University of Montana in a separate building from the lab in which we performed polymerase chain reaction (PCR) amplification.

Participants in the National Lynx Survey sent written reports to the Forest Service Regional Office in Missoula, or to the Missoula Lab. The written reports consisted of a set of maps showing the location of transects, vegetation forms, and a record of the stations from which hair had been collected. By matching information within the written reports with the vials and pads received at the Missoula Lab, we could detect any addition or deletion of samples that might have occurred. Additionally, we requested information concerning problems encountered in implementing the survey and ideas as to how the survey could be improved. These suggestions have led to a variety of minor changes in the field protocol.

The extracted DNA is then taken from the hair lab located on the University of Montana to the main laboratory located in the USDA Forest Service Forestry Sciences Laboratory, both in Missoula. Species identification methods were developed using extensive internal and external blind tests, as well as geographic range tests to confirm that the DNA differences used to separate species were consistent within the species and consistently different between species. Species identification of black bear and brown bear, coyote, wolf/dog, foxes, and mustelids, such as fisher, marten, or weasel is also performed. Additionally, other species are identified by sequencing the DNA and matching the derived base pair strings to data from Genbank, a database that serves as the primary international receptacle for DNA data. Positive and negative controls are included in every reaction. The positive control is a sample from a known organism of the target species. The positive control demonstrates that if a sample from the target species is present we are able to detect it. The negative control is water, and is used to test for the presence of contaminants in the reagents. The results of all laboratory reactions, in the form of gel images, are incorporated into lab books along with the species identification and associated notes.

We consulted extensively with the Fish and Wildlife Service Forensic lab in Ashland, Oregon concerning how to best preserve the chain-of-evidence associated with forensic samples. Records of all of the gels we have run are kept in lab books, all of the extracted DNA samples are preserved in 20-below-zero freezers, and all hair samples are held in sealed, desiccant filled vials, in locked cabinets in our hair extraction lab. If there are issues associated with a specific sample, we can readily access the DNA analyses, extracted DNA, and the original hair sample.

Follow-up Surveys

We initiate follow-up surveys when we identify a lynx sample in an area where, prior to the survey, we did not know that lynx were present. Where access permits (and it has so far) we utilize an extremely intensive winter-long snow tracking protocol designed and tested by Dr. John Squires to find lynx in preparation for trapping and subsequent radio-tracking. This allows us to separate detections associated with pets, lone wanderers, fur farm escapees, and falsified or unexplained samples from lynx detections associated with populations of conservation interest. We are running two such surveys this winter in the Boise and Shoshone National Forests, the only heretofore unknown lynx locations associated with the National Lynx Survey to date.

Check-backs and Validation

There are 2 potential errors that can affect a survey. First, the survey could falsely identify lynx in areas where they do not exist. The second is that the survey could fail to detect lynx in areas in which they do exist (Table 1).

The first error, false positives, is primarily controlled by the rigor of the lab work. In this context, we demonstrated that the genetic assays we use for species identification are consistent across the ranges of all of the potential felids, and were diagnostic 100% of the time in rigorous double-blind tests. The extreme reliability of these assays is the primary strength of the method, and one of the primary reasons we chose DNA analysis.

Even though we have processed more than 1200 hair samples with sufficient DNA to amplify, we have only found 4 samples of lynx in areas where we were unaware of their presence prior to the survey. These occurred on the Boise and Shoshone National Forests. We are engaging in follow-up surveys of the types mentioned earlier in both areas this winter. We believe that the use of well-tested DNA analyses, combined with intensive follow-up surveys virtually eliminates the possibility of false positive results.

The second error, failing to detect lynx when they are, in fact, present cannot be entirely eliminated, but can be controlled through thorough field methods. To reduce the chances of failing to detect lynx, the survey employs a large number of approaches (Table 1). However, the real test of any survey is determined by directly testing its efficacy in the field. That is why we have placed so much emphasis on placing survey grids in areas in which lynx presence is known or strongly suspected.

Lynx Detections Not Associated With Lynx Conservation

There are lynx detections that occur within the National Lynx Survey that are not of conservation concern. For instance, lynx are domesticated both as pets and in fur farms, and may wander off or escape. Additionally, even though we have protocols to keep the lynx detection stations out of sight from roads or trails, and to limit the knowledge of their locations, people can, and have, planted lynx hair within our survey. To separate these occurrences from actual lynx populations, we rely on follow-up surveys. In these surveys, we look for evidence of multiple lynx, family groupings (the young-of-the-year travel together with their mother), and the spatial extent of the track data. Additionally, because we collect hair from the snow along all lynx tracks encountered, we may be able to evaluate the population more directly. As an example, on one of our test grids we obtained 12 hair samples associated with lynx, and 7 of these samples were from different individual lynx. If lynx hair were planted in areas that contain no lynx, in our follow-up surveys we would not find tracks, lynx hairs associated with the tracks, or other evidence of lynx such as scat. We, therefore, believe that the overall integrity of the survey is robust and will detect the presence of escaped pets, or willful data manipulation.

Summary

In summary, Mr. Chairman, we believe we can verify the scientific authenticity of the National Lynx Survey based on the reasons I have cited: survey methods, DNA analyses, and measures used to ensure quality and reliability associated with the National Lynx Survey. We believe the integrity of the overall survey has been maintained. This concludes my statement; I would be happy to answer any questions you or members of the Committee might have.

Literature cited not included in the attached National Lynx Survey

Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon and W. J. Zielinski. 1994. The scientific basic for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. USDA Forest Service General Technical Report RM-234.

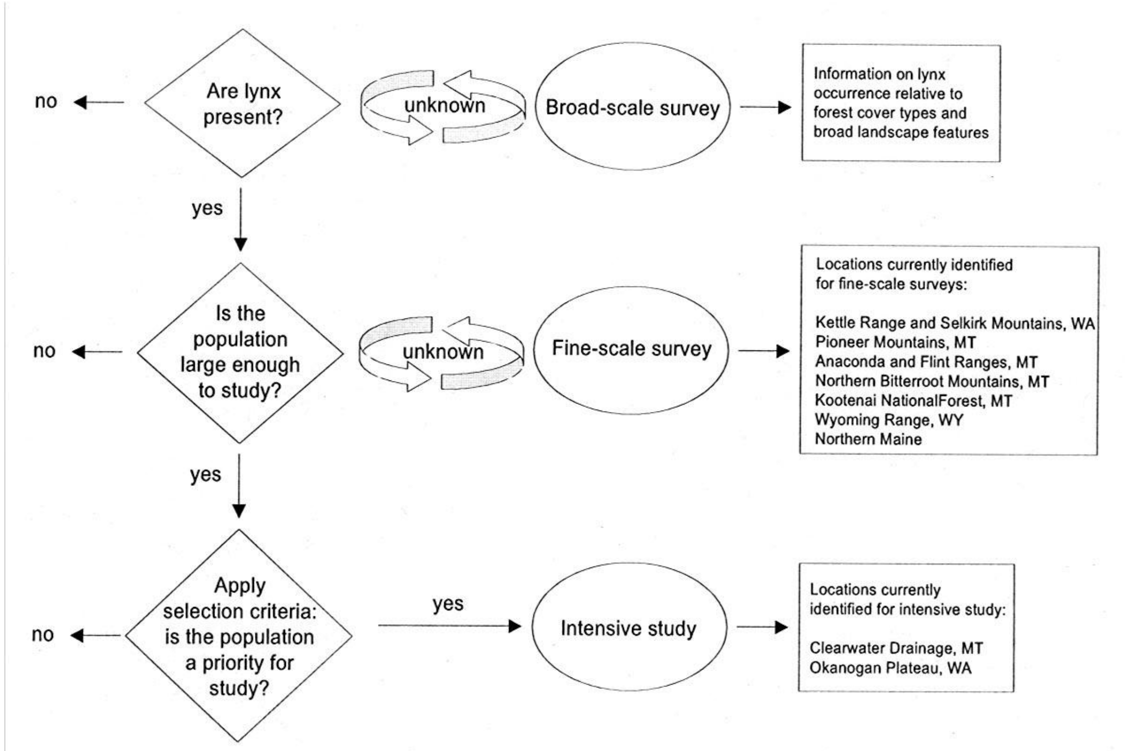

Figure 1. A schematic representation of the process for identifying areas where lynx can be studied, or conserved. The National Lynx Survey primarily answers the first question: are lynx present? From Aubry et al. (2000).

Table 1. Protocols in the National Lynx Survey designed to eliminate false positive results and to both increase and test the likelihood that the survey will detect lynx when present.

Avoiding false positive results	**Detecting lynx when present**
Geographic range tests of DNA methods Test results consistent Blind tests of DNA methods 100% success Quality controls in the lab Careful documentation of samples, reactions Positive and negative controls on each reaction Total separation between extraction and PCR Follow-up surveys for all lynx identifications outside of test grids	Use of a method that allows representative surveys of roadless areas. Testing the efficacy of the method In Kluane lynx detected on 45% of transects We use the best lure tested Saturation of the sample areas with 125 stations in 25 transects Conducting the survey for 3 years If protocol is not followed, the local survey doesn't count towards the 3 years Complete standardization of all materials and training used in the survey Geographic range tests of DNA methods Test results consistent Blind tests of DNA methods 100% success Multiple DNA extractions if PCR is unsuccessful About 80% amplification rate Positive controls on every reaction Running multiple test grids to directly evaluate survey efficacy